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The Master Battle Planner

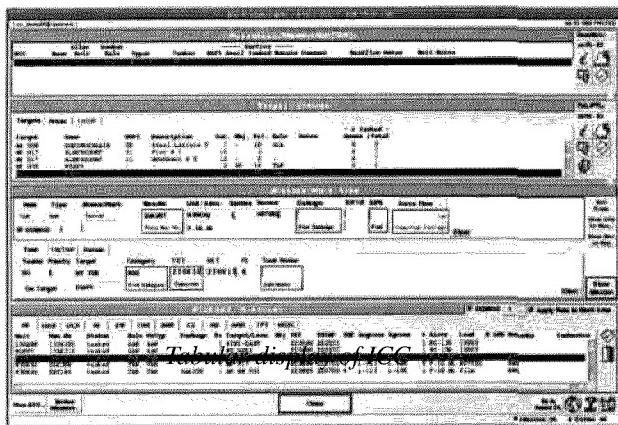
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Summary: The development of the MBP commenced as an investigation into novel HCIs, and has now been extended as a tool for Master Air Attack Plan production. As the system is PC-based, minimal support is required and campaign planning can literally commence using a laptop in transit to the operational theatre.

Introduction: The Master Battle Planner (MBP) is a prototype developed by DERA as a result of a study into the operational process of the UK CAOC. A technology gap was identified and the MBP was developed to replace a manual procedure in developing the Master Air Attack Plan

Existing air battle planning systems, CTAPS/TBMCS and ICC, were implemented on Unix platforms, and make use of commercial relational databases. An example of an ICC display is given below.



Unfortunately the display presented to the planner has tended to mimic the layout of these database tables, i.e. rows of textual information. This can lead to a number of serious problems:

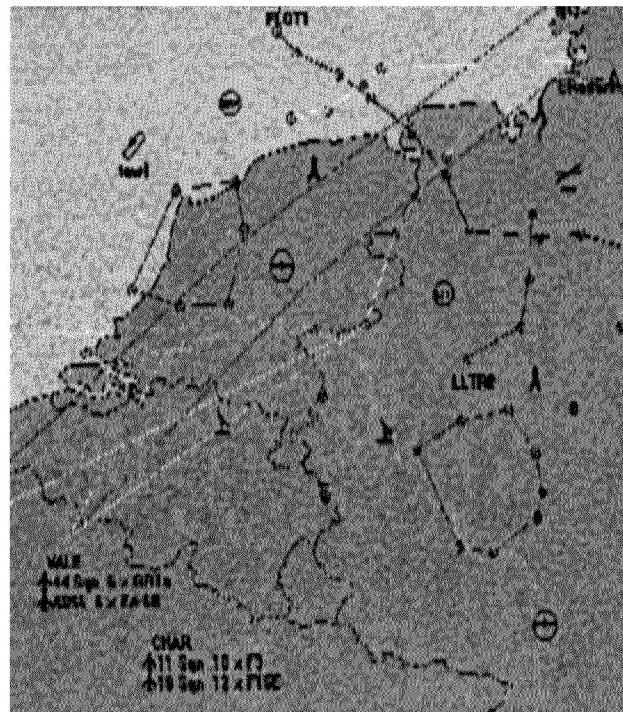
- A large table means that navigating through the data is a difficult task as the number of rows and columns can exceed the space available on the screen.
- Some data can also be difficult to understand, e.g. a latitude/longitude displayed as an alphanumeric string contains no contextual value.
- Entering data into a table is a change from the process of manually drawing the plan with Chinagraph pens. The planner has been forced to modify the process to suit the tool, rather than the tool support the process.

The development of the MBP prototype investigated methods of improving the user interface. It was implemented

as a map based system onto which planners could drag and drop representations of assets, airbases, targets, air units, etc. Missions are planned by dragging an air unit from an airbase onto a target, in the same manner that files can be moved between directories in Windows Explorer. As far as possible the system was designed to have the look and feel of a standard PC application.

By reducing the fidelity of information, e.g. the characteristics of aircraft and airbases, the need for a large database was removed. This, plus the intuitive design of the user interface means that the lead-time in populating a scenario for a given operation can be drastically reduced

A PC implementation also drastically reduces the hardware costs of the system. Whereas CTAPS/TBMCS require a minimum of 9 Unix servers supporting any number of Unix workstations, plus software licences for databases and graphics applications, the MBP can run on a single standard PC, or laptop, with the Windows operating system.

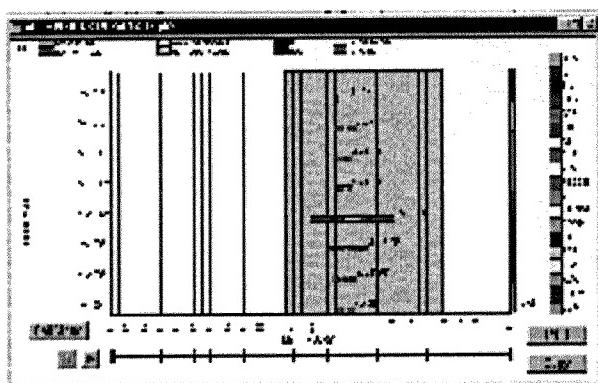


Direct interaction with map-based plan

Master Air Attack Plan (MAAP) Production: The principal aim within an MAAP production organisation is to achieve the objectives defined by a higher authority by creating a plan which makes the most effective use of the available resources against the nominated targets.

The Master Battle Planner (MBP) provides a graphical and highly intuitive method for visualising the battle scenario and developing the MAAP. The planner is continuously immersed in the battle scenario and this provides a high degree of situation awareness. MBP is designed to be very flexible, and can be used in a standalone mode or in conjunction with more complex planning systems.

Battle Scenario Visualisation: MBP provides the



Direct interaction with mission timings

planner with facilities to establish *the* battle scenario with an intuitive toolset. MBP provides a map-based approach to planning which allows visualisation of the entire battle scenario. It supports interrogation and modification of all objects by interaction with them on the displayed map or in other data views including Gantt charts, histograms, etc.

During the planning of the campaign the planner must ensure that the planned assets have been co-ordinated, so that, for example, a fighter or bomber rendezvous at the correct time and place with a tanker. One of the data views provided to the planner is a Gantt chart, shown below, depicting the planned schedule. Individual items can be manipulated within the Gantt chart?

Some assets, e.g. a tanker, have vertical bars stamped on the schedule, which represent the time on station. This assists the planner in aligning the receiving asset to the tanker so that tanking time on the receiver can be aligned with the tankers' time on station.

Previewer: MBP allows the planner to perform a “sanity check” on the plan by providing a preview capability. As the plan is constructed the plan can be “animated” to show the flow of the plan, assets are shown to take off from the bases, follow the planned route and return to base.

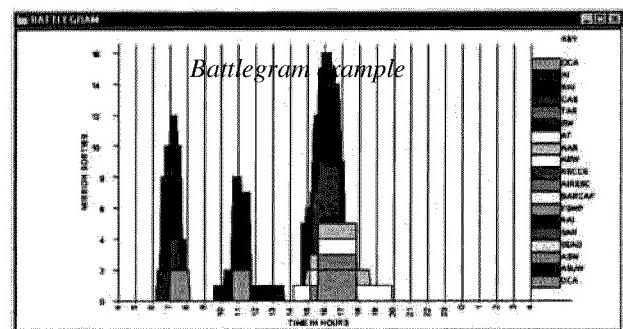
This will show, for example, that the tanker is on station when the fighter arrives, or that assets do not fly near



Previewing the map-based plan

an enemy SAM site before the planned TLAM cruise missile has destroyed the SAM.

Battlegram: Also included within the MBP is the ability to view the planned missions as a Battlegram. This allows the planner to view the flow of the battle as a number of sorties planned against a period of time - the 24 hour ATO period. The Battlegram will highlight any gaps in the plan, e.g. gaps in CAP or AEW coverage.



MBP does not contain any artificial intelligence to indicate to the planner that mistakes in scheduling, like those outlined above, have been included in a plan. The intelligence is contained within the planner creating the plan, rather than the tool. However, some simple rules have been implemented to assist the planner, e.g. to warn the planner when they have overtasked a unit.

Exercises and operational evaluations, in the UK and as part of NATO and coalition exercises, have shown that the MBP is an invaluable aid to improving situation awareness and reducing plan development time. When projected onto a touch sensitive display, the MBP is a perfect focus for teamwork. An additional benefit is that the MBP system provides an excellent means of briefing the plan to the Commander, saving time and reducing the IT support required.

Discussion - Paper 15

The MBP is releasable to TTCP and NATO on written request, naming a point of contact. The Demo presented showed how a mission could be created, and assessed with the MBP. The display shows whether the mission as described is feasible. There are thus interactions implicit in an underlying database. One can create packages of missions, which generates cross-checking. Movies of missions can let humans see potential problems. Asset allocation is shown, with over tasking alerts.

The software does not currently interface with other tools, however, one can get data into it from other databases. It uses a flat file, not a database, and can be set up quickly in new situations.